BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE PILANI

EEE F435 Digital Image Processing

Assignment 5

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Matlab Code:

```
clear all;
close all;
sample=imread('cameraman.tif');


A=imresize(sample,[512,512]);


[r, c] = size(A);
count = zeros(1, 256);
for col = 1 : c
for row = 1 : r
gray_level = A(row, col);
count(gray_level+ 1) = count(gray_level+1) + 1; %matlab
discards 0 indexing
end
end


%plott of histogram
% x = 0 : 255;
% bar(x, count, 'BarWidth', 1);
% xlabel('Gray Level');
% ylabel('count of Pixel value');
% title('Histogram');
% grid on;


N=0;
for i=1:256
    N=N+count(i);
end


P=zeros(1,256);
 for i=1:256
```

```
    P(i)=count(i)/N; %Probablity of intensity levels
 end

 % Now we wary T(threshold) using loop and find max of the
variance
 maxi=0;
 for T=0:255

    P1=sum(P(1:T)); % Probability of class 1 and class 2
    P2=sum(P(T+1:256));


    m1=dot([0:T-1],P(1:T))/P1;
 % mean of class 1 using scalar dot product

    m2=dot([T:255],P(T+1:256))/P2; % mean of class 2

    mg=dot([0:255],P(1:256));

    sigma_squared=(P1*(m1-mg)^2)+(P2*(m2-mg)^2);
%in-between class variance


    %getting maximum values between two

    if sigma_squared>maxi
        maxi=sigma_squared;
        threshold=T-1;
    end
 end
```

```
 % Plot after thresholding
 imag=A;
 for i=1:512
     for j=1:512
         if(A(i,j)<(threshold))
             imag(i,j)=0;
         else
             imag(i,j)=255;
         end
     end
 end

imshow(imag);
disp("Threshold obtained using otsu method is " +
threshold);
```

Results

The threshold value obtained using otsu method is **88.**

Following is the **segmented image**

Following is the **original image.**

We were able to segment cameraman from its background and highlight important features in the resultant image.

However we cannot figure out minute differences from the segmented image such as right hand of cameraman, and some of the background buildings.